

List of Contents

NUMBER 1/2

PROCEEDINGS OF THE 19TH INTERNATIONAL CONFERENCE ON COMPUTERS AND INDUSTRIAL ENGINEERING

Sabah U. Randhawa

xiii **Editors' Note**

PRODUCTION SCHEDULING—PART A

**M. A. Younis
and B. Saad**

1 **Optimal resource leveling of multi-resource projects**

INDUSTRIAL ENGINEERING : TECHNOLOGY AND EDUCATION

**C. Patrick Koelling,
Mario G. Beruvides and
Kriengkrai Tankoonsombut**

5 **Technology's impact on the future of industrial engineering**

**Eui H. Park, Bala Ram
and Rajiv Girdhar**

9 **Educating manufacturing professionals for the 21st century**

Jill A. Swift

13 **Using TQM to identify education improvement opportunities in the College of Engineering at the University of Miami**

**Gary P. Maul
and John S. Gillard**

17 **Teaching problem solving skills**

**Jim Mayfield
and Kamal S. Ali**

21 **The Internet as an educational tool**

**John E. Shea
and Thomas M. West**

25 **A methodology for curriculum development using multi-objective programming**

**Roger G. Ford
and Rafael Moras**

29 **A five-year quest for a "quality manufacturing" lab**

**Alicia Mendoza,
Marelys Garcia
and Martha Centeno**

33 **Design and prototype of a multimedia based statistical tutor**

**M. Lulu, G. Seyoum
and F. W. Swift**

37 **A decision model for technology transfer**

**Aysar P. Sussan
and Jong-Geun Oh**

41 **Transnational strategic alliances in the telecommunications industry**

**Halvard E. Nystrom and
Blanca E. Lara Enriquez**

45 **Survey results regarding telecommunications connectivity in manufacturing firms in Arizona and Sonora (Mexico)**

WORK DESIGN AND MEASUREMENT

- | | | |
|--------------------------------------------------------|----|------------------------------------------------------------------|
| C. Patrick Koelling
and Theresa D. Ramsey | 49 | Multimedia in work measurement and methods engineering |
| M. G. Vargas Cortes
and M. G. Beruvides | 53 | An analysis of middle management work in non-steady conditions |
| Eleftherios Iakovou
and Christos Douligeris | 59 | Strategic transportation model for oil in US waters |
| Eric D. Dohse
and Kenneth R. Morrison | 63 | Using transportation solutions for a facility location problem |
| Charity M. Lynn
and Kenneth R. Morrison | 67 | Plant layout selection process for the fifth-generation Corvette |

QUALITY MANAGEMENT

- | | | |
|----------------------------------------------------|----|-----------------------------------------------------------------|
| Aysar P. Sussan
and William C. Johnson | 71 | Integrating customer-base strategies into effective measurement |
| Tariq A. Aldowaisan
and Lotfi K. Gaafar | 75 | A framework for a process reengineering decision support system |

PRODUCT-PROCESS DESIGN

- | | | |
|---------------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------|
| Chetan Shukla,
Michelle Vazquez
and F. Frank Chen | 79 | Virtual manufacturing: an overview |
| Ali K. Kamrani | 83 | An integrated knowledge-based system for product design feasibility and manufacturability analysis |
| Sanjay S. Jagdale
and Nirav Merchant | 87 | Implementing distributed controls for FMCs using Internet utilities |
| Godwin J. Udo
and Ike C. Ehie | 91 | Critical success factors for advanced manufacturing systems |
| Brandon G. Mabry
and Kenneth R. Morrison | 95 | Transformation to lean manufacturing by an automotive component supplier |
| Brett W. Braiden
and Kenneth R. Morrison | 99 | Lean manufacturing optimization of automotive motor compartment system |
| Adriano Nyaluke,
Bahaa Nasser,
Herman R. Leep
and Hamid R. Parsael | 103 | Rapid prototype work space optimization |
| Deborah M. Osborne
and Robert L. Armacost | 107 | Review of techniques for optimizing multiple quality characteristics in product development |

Continued

Contents

Eyler R. Coates, Bhaba R. Sarker and Thomas G. Ray	111	Manufacturing setup cost reduction
Seog Ju Chang, Park Young Hyun and Eui H. Park	115	Quality costs in multi-stage manufacturing systems
Kumar Nagarajan, D. L. Santos and K. Srihari	119	A computer aided cost estimation system for BGA/DCA technology
Kamal S. Ali and Adel L. Ali	123	Application specific integrated circuit design on a PC platform
Kamal S. Ali	127	Digital circuit design using FPGAs
Atef A. Ata, Ali R. Shahin and Shihab S. Asfour	131	Design of an industrial flexible robot controller using MATLAB
D. Manuel, M. Liang and F. Kolahan	135	A dynamic offsetting approach to tool path generation for machining convex pockets

CELLULAR MANUFACTURING

Jocelyn Drolet, Georges Abdulnour and Martin Rheault	139	The cellular manufacturing evolution
Martin Rheault, Jocelyn R. Drolet and Georges Abdulnour	143	Dynamic cellular manufacturing system (DCMS)
Gursel A. Suer and Angel A. Cedeño	147	A configuration-based clustering algorithm for family formation
Catherine Roze and Raja G. Kasilingam	151	Sizing of manufacturing systems considering process flexibility
Gürsel A. Süer	155	Optimal operator assignment and cell loading in labor-intensive manufacturing cells
Keytaek H. Oh	159	The computerized operator-machine system (OMS) for the least cost combination of operators and machines
Hamid Seifoddini and Manoocher Djassemi	163	Sensitivity analysis in cellular manufacturing system in the case of product mix variation

PROCESS PLANNING

Bahaa Nasser, F. A. El-Gayar, I. M. Zahran, Hamid R. Parsaei and Herma R. Leep	169	A prototype solid-modeling-based automated process planning system
---------------------------------------------------------------------------------------------------	-----	--------------------------------------------------------------------

Continued

Contents

John M. Usher and Kiran J. Fernandes	173	A two-phased approach to dynamic process planning
S. Abo-Rayia, M. Basta, G. Abd-Rabbo, W. Mostafa, S. El-Masry, R. Taher and S. Metwalli	177	Optimum conventional computer aided process planning
Arnold Ku, K. Srihari and Jude Dilella	181	Process planning for manual PWB assembly
John M. Usher	185	A STEP-based object-oriented product model for process planning

PRODUCTION SCHEDULING—PART B

M. G. Pereira	189	A planning and scheduling system for manufacturing environment
A. Claudio Garavelli, O. Geoffrey Okogbaa and Nicola Violante	193	Global manufacturing systems: a model supported by genetic algorithms to optimize production planning
Z. Xu and S. Randhawa	197	Dynamic job shop scheduling in a tool shared environment
Feng-Chang R. Chang	201	A study of due-date assignment rules with constrained tightness in a dynamic job shop
Chentsau Chris Ying	205	Specification of a job shop scheduling simulation model and some properties of its internal transition function
Ali Allahverdi and M. Fatih Tatari	209	Simulation of different rules in stochastic flowshops
Yi-Ching Eric Li, Wade H. Shaw Jr and Louis A. Martin-Vega	213	Flow-time performance of modified scheduling heuristics in a dynamic rescheduling environment
Royce O. Bowden, John D. Hall and John M. Usher	217	Integration of evolutionary programming and simulation to optimize a pull production system
Bhaba R. Sarker and Chidambaram V. Balan	221	Operations planning for kanbans between two adjacent workstations
Surendra M. Gupta and Charles R. McLean	225	Disassembly of products

PROJECT SCHEDULING

Mostafa M. Khattab and Ketil Søyland	229	Limited-resource allocation in construction projects
-------------------------------------------------	-----	------------------------------------------------------

Continued

- Abel A. Fernandez** 233 The role of the nonanticipativity constraint in commercial software for stochastic project scheduling
and **Robert L. Armacost**

QUALITY CONTROL AND RELIABILITY

- Mitsuo Gen** 237 Optimal design of system reliability using interval programming and genetic algorithms
and **Runwei Cheng**
- W. Pujadas** 241 A reliability centered maintenance strategy for a discrete part manufacturing facility
and **F. Frank Chen**
- Heung-Suk Hwang** 245 A reliability prediction model for missile systems based on truncated Weibull distribution
- Maria E. Camargo,** 249 Spectral decomposition in statistical process control
R. Radharamanan,
Angela I. Santos
and **D. G. Petry**
- Gary P. Maul,** 253 Statistical process control applied to gas metal arc welding
Richard Richardson
and **Brett Jones**
- Steven M. Zimmerman,** 257 The second battle of Mobile Bay - using SPC to control the quality of water monitoring
Michael R. Dardeau,
George F. Crozier
and **Barr Wagstaff**
- E. F. Saibt, V. M. F. Barchet** 261 Use of multivariate analysis in controlling a soft drink fabrication process
and **R. Radharamanan**
- Wade C. Driscoll** 265 Robustness of the ANOVA and Tukey-Kramer statistical tests
- Soumaya Yacout** 269 Using control charts for parameter estimation of a homogeneous Poisson process
and **Yusuo Chang**

INFORMATION SYSTEMS

- J. H. Manley** 273 Enterprise information system modeling for continuous improvement
- David A. Koonce** 277 A formal methodology for information model level integration in CIM systems
and **Mark Rowe**
- Pascal Dreer** 281 Integration extension for computer integrated manufacturing applications
and **David A. Koonce**
- G. Allen Pugh** 285 Validation of a replacement manufacturing database
- Vicente Fernando Silveira,** 289 An information management system for forecasting environmental change
Suresh K. Khator and
Ricardo Miranda Barcia

Continued

Contents

Godwin J. Udo	293	Affecting the IS department characteristics with IS downsizing
Mickey L. Barton and Dia L. Ali	299	Ad hoc requests for information in databases
Bhate Sachin Kumar and Dia L. Ali	303	Object-oriented multimedia databases: making and management
Eric Summer and Dia L. Ali	307	A practical guide for implementing data warehousing
Ming Zhou and Dia L. Ali	311	Distributing data to the user: a distributed user querying interface standard for the future distributed database
Mahendar Madhavaram, Dia L. Ali and Ming Zhou	315	Integrating heterogeneous distributed database system
Benjawan Supituk and Dia L. Ali	319	Multiple reads, one write simultaneously in distributed database
Akula Ramesh and Dia L. Ali	323	Query transformation in heterogeneous distributed database systems

SIMULATION

Chong Peng and F. Frank Chen	327	Parallel discrete event simulation of manufacturing systems: a technology survey
Thomas M. Jones and Thomas J. Crowe	331	Using simulation to realize TQM within a technical support department
Bill J. Cvetkovski, Max T. Nutkowitz and Kenneth R. Morrison	335	Modeling car dealership credit operations using arena as a business process reengineering demonstration
David C. Baibak, Casey R. Williams and Kenneth R. Morrison	339	Using Arena to teach management concepts by creating business models
Nancy Gautreau, Soumaya Yacout and Réjean Hall	343	Using computer simulation to model process quality

OPTIMIZATION

Raja G. Kasilingam and Chee P. Lee	347	Selection of vendors — a mixed-integer programming approach
Jairo C. R. Vieira, Suresh K. Khator and Plínio Stange	351	Portfolio selection through mathematical programming in CAD environment

Continued

Contents

Isabelle Renaud and Soumaya Yacout	355	Resource allocation and optimal product mix at a fish and seafood processing company
R. Meenakshi Sundaram and Lester Blair	359	A heuristic algorithm to minimize energy cost for scheduling test facilities
N. Alp and S. L. Murray	363	A goal programming model to evaluate the production decision through the productivity sub-systems
Bhaba R. Sarker, Lawrence Mann Jr, Evangelos Triantaphyllou and Srinivas Mahankali	367	Power restoration in emergency situations
F. Kolahan and M. Liang	371	A tabu search approach to optimization of drilling operations
A. Edwin Alexander and Adel L. Ali	375	A parallel algorithm for analysis of large-scale networks
Takao Yokota, Takeaki Taguchi and Mitsuo Gen	379	A solving for an optimal loaded-allocation problem of simple beam
Sergio deRada and Adel Ali	385	A high-resolution contouring algorithm (HRCA)
Amjed M. Al-Ghanim and Neil R. Aukland	389	A programming technique for generating minimal paths a general network

APPLICATIONS IN ARTIFICIAL INTELLIGENCE: NEURAL NETWORKS, FUZZY LOGIC, OBJECT-ORIENTED MODELING

M. G. Pereira	393	Artificial intelligence—techniques for search results in programming projects
Eric Chu, K. Srihari and C. R. Emerson	397	Distributed artificial intelligence in process control
Margaret K. Mayer and Louis J. Plebani	401	An object oriented approach to algorithm management on networked workstations
Ayman M. Wasfy and Yasser A. Hosni	405	Object-oriented modeling of two-party negotiation
Chia-hao Chang and Yubao Chen	409	Autonomous intelligent agent and its potential applications
M. G. Pereira	413	Expert systems — aspects we must consider for use in production programming
Payman Jula, Azim Houshyar, Frank L. Severance and Anil Sawhney	417	Application of artificial neural networks in interactive simulation

Continued

Contents

- | | | |
|------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------|
| Angela P. Ansuj,
M. E. Camargo,
R. Radharamanan
and D. G. Petry | 421 | Sales forecasting using time series and neural networks |
| Kuo-Cheng Ko
and Joseph C. Chen | 425 | A fuzzy-nets training scheme for controlling non-linear systems |
| Daniel Ligas and Adel Ali | 429 | Neural net — fuzzy logic rules mapping for dynamic of fuzzy sets boundaries |
| Dia Ali, Mir Hossain
and David Haas | 435 | Cellular atrophy for realistic neural nets |

IE APPLICATIONS IN HEALTH CARE SYSTEMS

- | | | |
|---------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------|
| R. Radharamanan
and L. P. Godoy | 439 | Standardization of the nutrition and diet division of the University Hospital in Santa Maria |
| R. Radharamanan
and Leoni P. Godoy | 443 | Quality function deployment as applied to a health care system |
| E. G. Tsacle and N. A. Aly | 447 | An expert system model for implementing statistical process control in the health care industry |
| Steven M. Zimmerman
and Steven Ringer | 451 | Issues in clinical monitoring |
| Michael Pose, Sara J. Czaja
and Jeffrey Augenstein | 455 | The usability of information technology within emergency care settings |
| Chentsau Chris Ying | 459 | Productivity and staffing analysis of a sterile processing department |

IE APPLICATIONS IN FOREST PRODUCTS INDUSTRY

- | | | |
|----------------------------------------------------------------|-----|---------------------------------------------------------------------------------------|
| Y. Zeng, S. Randhawa
and J. Funck | 463 | An expert system for softwood lumber grading |
| Hannu Kivijärvi
and Markku Tuominen | 467 | A decision aid in strategic planning and analysis of a wood-processing company |
| R. Radharamanan,
L. P. Godoy
and K. I. Watanabe | 471 | Quality and productivity improvement in a custom-made furniture industry using Kaizen |

OTHER IE APPLICATIONS

- | | | |
|-------------------------------------------------|-----|---------------------------------------------------------|
| Maria E. Camargo
and R. Radharamanan | 475 | Bayesian modeling of the Brazilian inflationary process |
|-------------------------------------------------|-----|---------------------------------------------------------|

HUMAN FACTORS ENGINEERING

- | | | |
|------------------------|-----|---------------------------------------------|
| Marc L. Resnick | 479 | Concurrent ergonomics: a proactive approach |
|------------------------|-----|---------------------------------------------|

Continued

Contents

Dara Strickland, Barbara Pioro and Celestine Ntuen	483	The impact of cockpit instruments on pilot exhaustion
Alexandria R. Watson, Celestine Ntuen and Eui Park	487	Effects of task difficulty on pilot workload
Marc Resnick	491	Postural changes due to fatigue
F. Calisir and M. R. Lehto	495	Drivers' risk assessments and their impact on seat belt use
Michelle S. Pitman and Celestine A. Ntuen	499	The effect of prolonged sitting on mental task performance
Khaled T. Mohamed, Shihab S. Asfour, Mahmoud A. Moustafa and Hasan A. Elgamal	503	A computerized dynamic biomechanical model of the human shoulder complex
M. J. Miller, Adel Ali and Kamal Ali	507	Refinement of algorithms for the real-time simulation of human movements in computer models
Victor Zaloom and Prakash Ramachandran	511	A computer based training system for process safety management
Sherif M. Waly, Shihab S. Asfour and Tarek M. Khalil	515	Effects of time windowing on the estimated EMG parameters
Marelys L. Garcia and Cesar I. Caldera	519	The effect of color and typeface on the readability of on-line text
Donghyun Park, Jaewook Choi and Andris Freivalds	525	The first ergonomic evaluation for CTDs in Korea
Julie A. Jacko and David J. Rosenthal	529	The effect of age on mapping auditory icons to visual icons for computer interface design
Julie A. Jacko and Kenneth G. Ward	533	Toward establishing a link between psychomotor task complexity and human information processing

NUMBER 3/4

SELECTED PAPERS FROM THE 18TH INTERNATIONAL CONFERENCE ON COMPUTERS AND INDUSTRIAL ENGINEERING

Weixuan Xu and Jifa Gu

ix Preface

Continued

GENERAL SECTION

- | | | |
|----------------------------------------|-----|-----------------------------------------------------------------|
| Weixuan Xu
and Ruigang Wang | 537 | Applications and development of industrial engineering in China |
| Kyu-Kab Cho | 543 | Manufacturing technology in Korea |

MANUFACTURING SYSTEMS AND THEORY

- | | | |
|----------------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------|
| Mooyoung Jung,
Min Keun Chung
and Hyunbo Cho | 551 | Architectural requirements for rapid development of agile manufacturing systems |
| Joon-Mook Lim,
Kil-Soo Kim,
Bong-Jin Yum
and Hark Hwang | 555 | Determination of an optimal configuration of operating policies for direct input-output manufacturing systems using the Taguchi method |
| Chi Qiqin, Jiang Shan,
Lin Weidong
and Du Junmin | 561 | Application of I.E. to the plan of production line in factory |
| Norio Watanabe
and Shusaku Hiraki | 565 | An approximate solution to a JIT-based ordering system |
| Merle Thomas Jr | 571 | Concurrent engineering: supporting subsystems |
| Yeongho Kim | 577 | Prioritized constraint network representation and processing for concurrent engineering models |

CIM, FMS CELLULAR MANUFACTURING, GT

- | | | |
|---------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------|
| Kap Hwan Kim,
Jong Wook Bae,
Joon Yub Song
and Hyun Yong Lee | 583 | A distributed scheduling and shop floor control method |
| Runwei Cheng, Mitsuo Gen
and Tatsumi Tozawa | 587 | Genetic algorithms for designing loop layout manufacturing systems |
| Heung-Suk Hwang | 593 | A performance evaluation model for FMS based on RAM and LCC using FACTOR/AIM |
| Linhu Zhao,
Yashuhiro Tsujimura
and Mitsuo Gen | 599 | Genetic algorithm for robot selection and work station assignment problem |
| Wang Gang, Xu Xiaofei
and Gao Guoan | 603 | HIT-IIP: an information integrating platform for CIM system based on client/server architecture |
| Young-Q Lee
and Hee-Jun Shin | 609 | CIM implementation through JIT and MRP integration |

Continued

PROCESS PLANNING AND CONTROL, SCHEDULING

- | | | |
|-------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------|
| In-Ho Kim, Jung-Soo Oh
and Kyu-Kab Cho | 613 | Computer aided setup planning for machining processes |
| K. Fukushima, K. Ho,
and C. T. Chiu | 619 | Scheduling system for multi-process production |
| Chun Nam Cha
and Hark Hwang | 625 | Experimental comparison of the switching heuristics for aggregate production planning problem |
| Mitsuo Gen,
Yashuhiro Tsujimura
and Yinxu Li | 631 | Fuzzy assembly line balancing using genetic algorithms |

LOGISTICS, MATERIAL HANDLING SYSTEM, FACILITIES LAYOUT

- | | | |
|------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------|
| Masatosi Kitaoka,
Takahide Nabeta,
Rui Nakamura
and Yanwen Dong | 635 | EIQNK curve analysis for the design of distribution center and warehouse with spline function |
|------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------|

MANUFACTURING TECHNOLOGIES

- | | | |
|------------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------|
| M. Thomas,
Y. Beauchamp,
Y. A. Youssef
and J. Masounave | 637 | Effect of tool vibrations on surface roughness during lathe dry turning process |
| Yves Beauchamp,
Marc Thomas,
Youssef A. Youssef
and Jacques Masounave | 645 | Investigation of cutting parameter effects on surface roughness in lathe boring operation by use of a full factorial design |

PRODUCT DEVELOPMENT, ERGONOMIC DESIGN

- | | | |
|--------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------|
| Myun W. Lee,
Jong Soo Lee,
Cha Ryong Koo
and Myung Hwan Yun | 653 | A model for estimating the potential demand of high touch product |
| M. J. Wang,
G J. Huang, W. Y. Yeh
and C. L. Lee | 657 | Manual lifting task risk evaluation using computer vision system |
| Jae Young Kim,
Myung Hwan Yun
and Myun W. Lee | 661 | Design of optimum grip and control area for one-handed manual control devices |
| Linda Morris,
Larry Stauffer
and Dileep V. Khadilkar | 665 | Eliciting and managing information for product definition |

Continued

Contents

- | | | |
|---------------------------------------------------------|-----|------------------------------------------------|
| Xiping Zhang,
Jürgen Bode
and Shouju Ren | 669 | Neural networks in quality function deployment |
|---------------------------------------------------------|-----|------------------------------------------------|

- | | | |
|---------------------------------------------|-----|-----------------------------------------------------------------------|
| Donghyun Park
and Myung Hwan Yun | 675 | An application of psychophysical ratings to external force estimation |
|---------------------------------------------|-----|-----------------------------------------------------------------------|

DESIGN, CAD

- | | | |
|-------------------|-----|------------------------------------------------------------------------|
| Li Wenfeng | 681 | Feature modelling from 2D drawings and product information description |
|-------------------|-----|------------------------------------------------------------------------|

- | | | |
|----------------------------------------------------|-----|------------------------------------------------------------------------------|
| Fang Weining, Zeng Li
and Liang Xichang | 685 | Research on intelligence recognition and reconstruction of engineering graph |
|----------------------------------------------------|-----|------------------------------------------------------------------------------|

- | | | |
|-------------------------------------------------|-----|----------------------------------------------------------------------------|
| Zhou Dugao, Zhou Jiang
and Song Juan | 691 | Optimization design of an axial-flow fan used for mining local-ventilation |
|-------------------------------------------------|-----|----------------------------------------------------------------------------|

ROBOTICS

- | | | |
|-----------------------------------------------------|-----|---------------------------------------------------------------------------------------------|
| Gen'ichi Yasuda
and Keihachiro Tachibana | 697 | A computer network based control architecture for autonomous distributed multirobot systems |
|-----------------------------------------------------|-----|---------------------------------------------------------------------------------------------|

- | | | |
|------------------------------------------------------------|-----|----------------------------------------------------|
| Wu Wei, Liu Danjun,
Liu Jinsong
and Wu Juan | 703 | Master-slave intelligent robot telepresence system |
|------------------------------------------------------------|-----|----------------------------------------------------|

MANAGEMENT

- | | | |
|-------------------------------------|-----|---------------------------------------------------------------------------------------------------------|
| Wang Qun
and Wang Yinluo | 707 | Multi-dimension dynamic testing of multi-hierarchy manpower and its expert system of group optimization |
|-------------------------------------|-----|---------------------------------------------------------------------------------------------------------|

ENGINEERING ECONOMICS

- | | | |
|---------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------|
| M. Iijima, Y. Takemoto,
Y. Oka, H. Kito,
Y. Nishigaki, K. Kataoka
and S. Asahi | 713 | Economic aspects of environmental investment in plant facilities |
|---------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------|

- | | | |
|--------------------------------------------------------------|-----|--------------------------------------------------------------------------|
| Oh Hyung-sik,
Lee Deok-joo
and Song Chang-won | 719 | An analysis of the cost structure of telecommunication industry in Korea |
|--------------------------------------------------------------|-----|--------------------------------------------------------------------------|

- | | | |
|-----------------------|-----|-------------------------------------------------|
| Wen-Hsien Tsai | 725 | Activity-based costing model for joint products |
|-----------------------|-----|-------------------------------------------------|

- | | | |
|----------------------------------------------------------|-----|----------------------------------------|
| Liu Ping, Hu Yongtong,
J. Bode and Ren Shouju | 731 | Multi-agent system for cost estimation |
|----------------------------------------------------------|-----|----------------------------------------|

- | | | |
|-------------------------------------------|-----|------------------------------------------------------------------------|
| Jae-Jeung Rho
and Hong Bae Kim | 737 | SIMBASE: an economic justification tool using project-based simulation |
|-------------------------------------------|-----|------------------------------------------------------------------------|

Continued

Contents

- | | | |
|-----------------------|-----|------------------------------------------------------------------------------|
| Takaomi Kaneko | 743 | Building a financial diagnosis system based on fuzzy logic production system |
|-----------------------|-----|------------------------------------------------------------------------------|

QUALITY CONTROL

- | | | |
|-----------------------------------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------|
| Liu Hongen
and Zhou Xianwei | 747 | A systematic planning approach to implementing total quality management through quality function deployment technique |
| Roderick Ma | 753 | Quality system: an integral part of total quality management |
| Takenori Takahashi | 759 | Statistical games and software tools for quality assurance based on statistical process control |
| Yasser A. Hosni,
Robert Safford,
Timothy S. Barth,
Deborah Osborne
and Teresita Stomayor | 767 | Knowledge based quality system in support of space shuttle operations |
| Xu Jichao | 775 | Variability detection and robustness design in complex production system |
| Liu Yumin | 779 | A improvement for MEWMA in multivariate process control |
| Abdellatif M. A. Haridy
and Adel Z. El-Shabrawy | 783 | The economic design of cumulative sum charts used to maintain current control of non-normal process means |
| Takahiro Ohashi
and Mitsugu Motomura | 791 | Tool life prediction for cup shaped cold forgings with fuzzy language risk analysis and fuzzy inference |

MONITORING, TESTING, MAINTENANCE

- | | | |
|----------------------------------------------------|-----|-----------------------------------------------------------------------------|
| Yang Hui, Yan Qin,
and Morita Shigeyuki | 797 | An artificial intelligence system of trouble diagnosis for aircraft engines |
| Z. Y. Wang
and C. Sahay | 803 | Agile monitoring system for turning of difficult-to-cut materials |
| Ma Yun and Zhang Youlin | 813 | Q control charts for negative binomial distribution |
| Ma Yizhong | 817 | Diagnosing for signal in multiple correlated processes |

SOFTWARE SYSTEM

- | | | |
|------------------------------------------|-----|-----------------------------------------------------------|
| Huang Jinghua | 821 | A quantitative method used in negotiation support systems |
| William R. Uttal
and Ning Lui | 827 | An integrated vision system based on combining algorithms |

Continued

**Leon A. Petrosjan
and Georges Zaccour**

833 A multistage supergame of downstream pollution

AI, EXPERT SYSTEM, NEURAL NETWORKS

Ma Shilong

839 A unified framework for modeling, simulating and explaining engineering systems

**M. S. Eid
and C. Moghrabi**

843 Natural language interfaces as expert systems for industrial applications

**Dijin Gong, Mitsuo Gen,
Genji Yamazaki
and Weixuan Xu**

849 Neural network approach for allocation with capacity

**Mitsuo Gen,
Yasuhiro Tsujimura
and Syunsuke Ishizaki**

855 Optimal design of a Star-LAN using neural networks

**Yinzhen Li, Mitsuo Gen
and Kenichi Ida**

861 Solving fuzzy shortest path problems by neural networks

**Runwei Cheng,
Tatsumi Tozawa,
Mitsuo Gen, Hajime Kato
and Yoshimasa Takayama**

867 AE behaviors evaluation with BP neural network

**Kenichi Ida, Mitsuo Gen
and Yinzhen Li**

873 Neural networks for solving multicriteria solid transportation problem

**Sun Linyan
and Wang Ying**

879 A neural network model for environmental predication: case study for China

INFORMATION TECHNOLOGY, DATABASE

**J. Jonker
and E. M. Ehlers**

885 IISICS for intelligent cooperation between sub-systems in a complex system

Ibtesam A. Dessouky

889 Navigating the Internet for engineering information

**Zhang Guangcheng,
Wang Lei and Li Long**

893 Abstract mathematical model of general management information systems

**Lin Xuanxiong, Li Huaizu
and Zhang Wenxiu**

897 Study and implementation of the virtual view in UNIX

**Chienwen Wu and Geneva G.
Belford**

901 Improving the flexibility for replicated data management in distributed database systems

MATHEMATICS, ALGORITHM

**D. W. Zheng, M. Gen
and K. Ida**

907 Evolution program for nonlinear goal programming

Continued

Contents

- Takao Yokota,
Mitsuo Gen, Yinxu Li
and Chang Eun Kim** 913 A genetic algorithm for interval nonlinear integer programming problem
- N. H. Wu
and K. C. Chan** 919 A genetic algorithm based approach to optimal fixture configuration
- Tian Peng, Wang Huanchen
and Zhang Dongme** 925 Simulated annealing for the quadratic assignment problem: a further study
- Soung Ryong Yee** 929 Interlocking number string and code matrix
- K. Ichida** 933 Constrained optimization using interval analysis
- Rahmat Budiarto,
Masashi Yamada,
Hidenori Itoh
and Hirohisa Seki** 939 An interactive system for constructing cat's cradle string diagram using GA
- Yang Lei and Xi Youmin** 945 A view of group decision making process and pivoting approach

I Announcements



PERGAMON

ISSN 0360 8352
CINDDL 31 (3/4) 579-948 (1996)

